REVISION NUMBER 1
SCOPE OF WORK
FOR
SITE INSPECTION
FOLLOW-UP

U.S. SCRAP
CHICAGO, ILLINOIS
TDD R05-8512-02(02A)

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SECTION 1

EXECUTIVE SUMMARY

This Scope of Work was prepared and submitted in response to Technical Directive Document (TDD) R05-8512-2(2A) issued under the REM/FIT Zone II contract for Remedial Planning/Field Investigations. The Scope of Work defines the proposed activities to complete a Site Inspection Follow-up (SIF) for the U.S. Scrap site located in Chicago, Illinois. The primary objectives of the SIF are to characterize the wastes present on-site; determine the nature and extent of contamination; determine the imminent and long-term hazards to public health; and identify other potential waste sites in the area of the U.S. Scrap site.

The proposed Scope of Work will be accomplished in five tasks and will require the following (estimate):

- 4900 FIT hours;
- $91,000 subcontracts and expenses;
- 158 CLP organic and inorganic analyses; and
- 16 months duration.

SECTION 2
INTRODUCTION

This Scope of Work was prepared by Region V Field Investigation Team, Ecology and Environment, Inc., (FIT) to define the of activities for accomplishing TDD R05-8512-2(2A) Site Inspection Follow-up (SIF) for the U.S. Scrap site located in Chicago, Illinois. The TDD was issued December 12, 1985.

The Scope of Work is divided into several sections. Section 2 - Introduction, includes objectives, background, investigations to date, and environmental setting information. Section 3 - Scope of Work, details the preparation for field investigations, conducting the field investigations, evaluation of investigation-derived data, and public health and toxicological assessment. Section 4-Schedule, presents the time frame for the project. Section 5 - Budget, presents a cost estimate. The requirements identified in the TDD and information from site specific discussions with United States Environmental Protection Agency (EPA) personnel have been incorporated into this Scope of Work.

OBJECTIVES

Pursuant to a CERCLA immediate removal action conducted in August, 1985, the EPA identified the potential for further response actions at the U.S. Scrap site. This SIF will provide the requisite data to evaluate the potential response actions. The objectives of this SIF include:

- review the existing data and identify any data deficiencies;
- characterize the wastes present on-site;
- determine the nature and extent of groundwater, surface water, soil, and sediment contamination on and adjacent to the U.S. Scrap site;
- assess the extent of off-site migration of contaminants and their impact on potential receptors;
- determine whether the site poses an imminent or long term hazard to public health, welfare, or the environment; and

- identify other potential hazardous waste sites in the area and their possible impact on the environment.

These objectives will be accomplished through an assessment of the existing conditions using available data and data generated in the proposed field investigation. The field portion of the SIF will include defining the site and surrounding areas; investigating the hydrogeology of the area and; sampling and testing of groundwater, surface water, sediment, surface and subsurface soils, and subsurface wastes.

BACKGROUND

SITE LOCATION

The U.S. Scrap site (T37N,R14E, Sec. 27) is located near 122nd Street and Cottage Grove Avenue on the far south side of Chicago, Illinois (Figure 2-1). The area is heavily industrialized. U.S. Scrap is a 9-acre site bordered on the south and east by the Metropolitan Sanitary District of Greater Chicago Calumet Sewage Treatment Plant (MSD) and the Chicago and Western Indiana railroad tracks on the west. The area west of the railroad embankment is divided into two sections. The northern section being marsh land and the southern section being land recently excavated by MSD to add new municipal wastewater sluge lagoons. Lake Calumet is approximately three-quarters of a mile to the east of the site and residential homes are located approximately one-quarter of a mile to the south and the west (Figure 2-2).

The area around the site is primarily comprised of landfills and industries. A 1985 report for the Illinois Department of Energy and Natural Resources identified over fifty disposal sites and over one hundred industries in the Calumet area. The disposal sites include sanitary landfills, on-site settling ponds, and general refuse dumps. Figure 2-3 shows the locations of a number of potential hazardous waste locations near the U.S. Scrap Site . The disposal methods used and the types of waste believed to be present at specific sites are presented in Table 2-1.

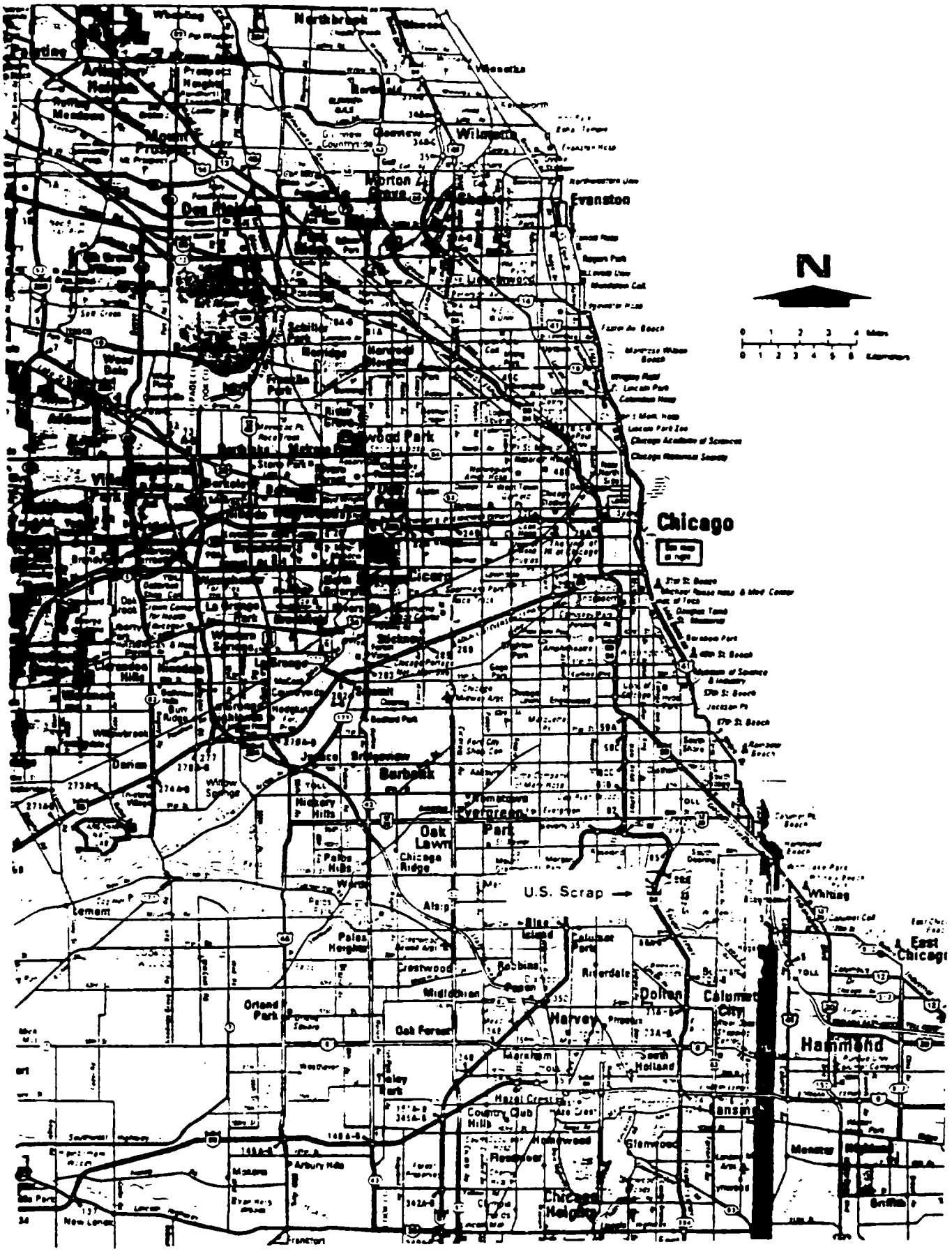

Figure 2-1
General site location
U.S. Scrap

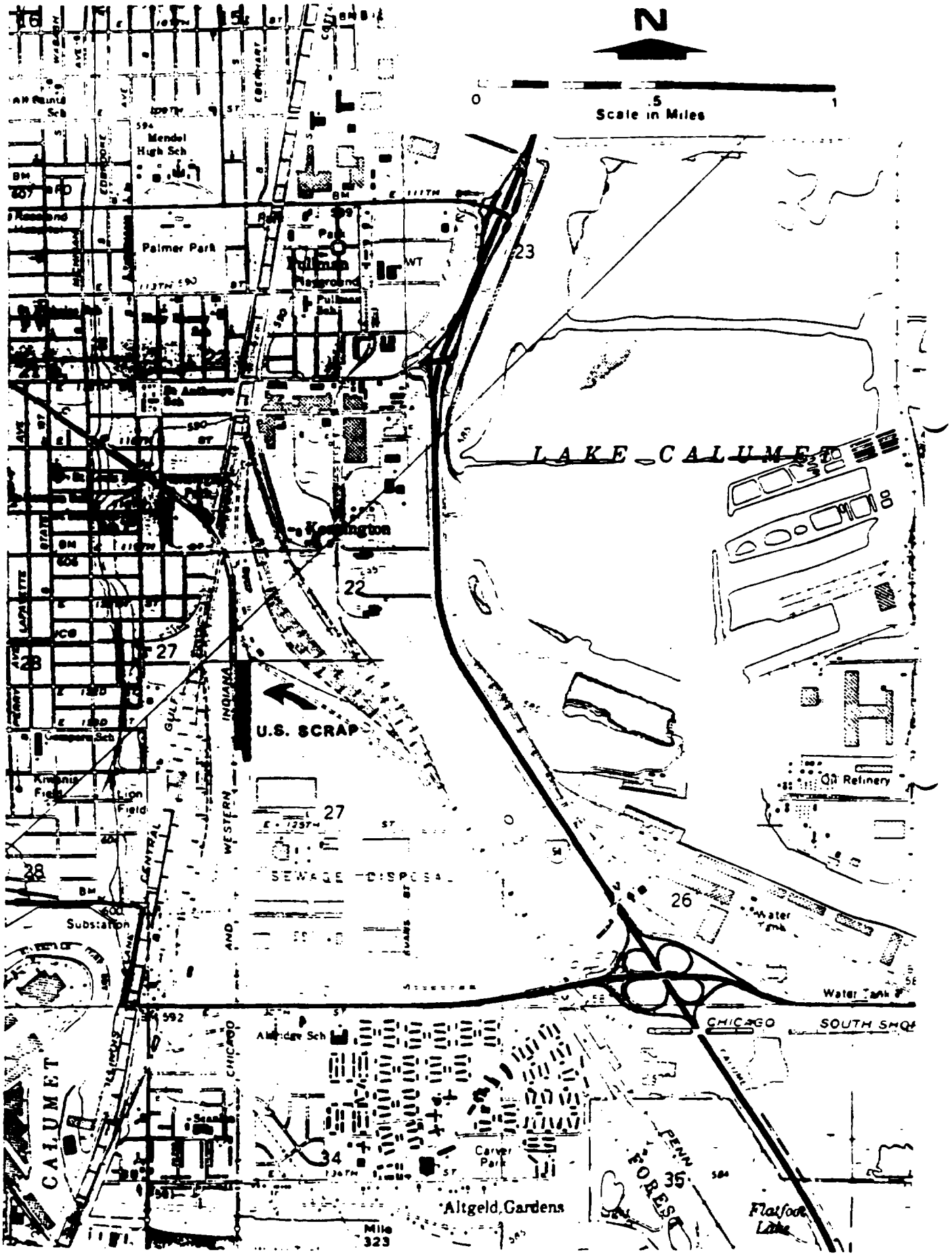

Figure 2-2
Site location map.
U.S. Scrap

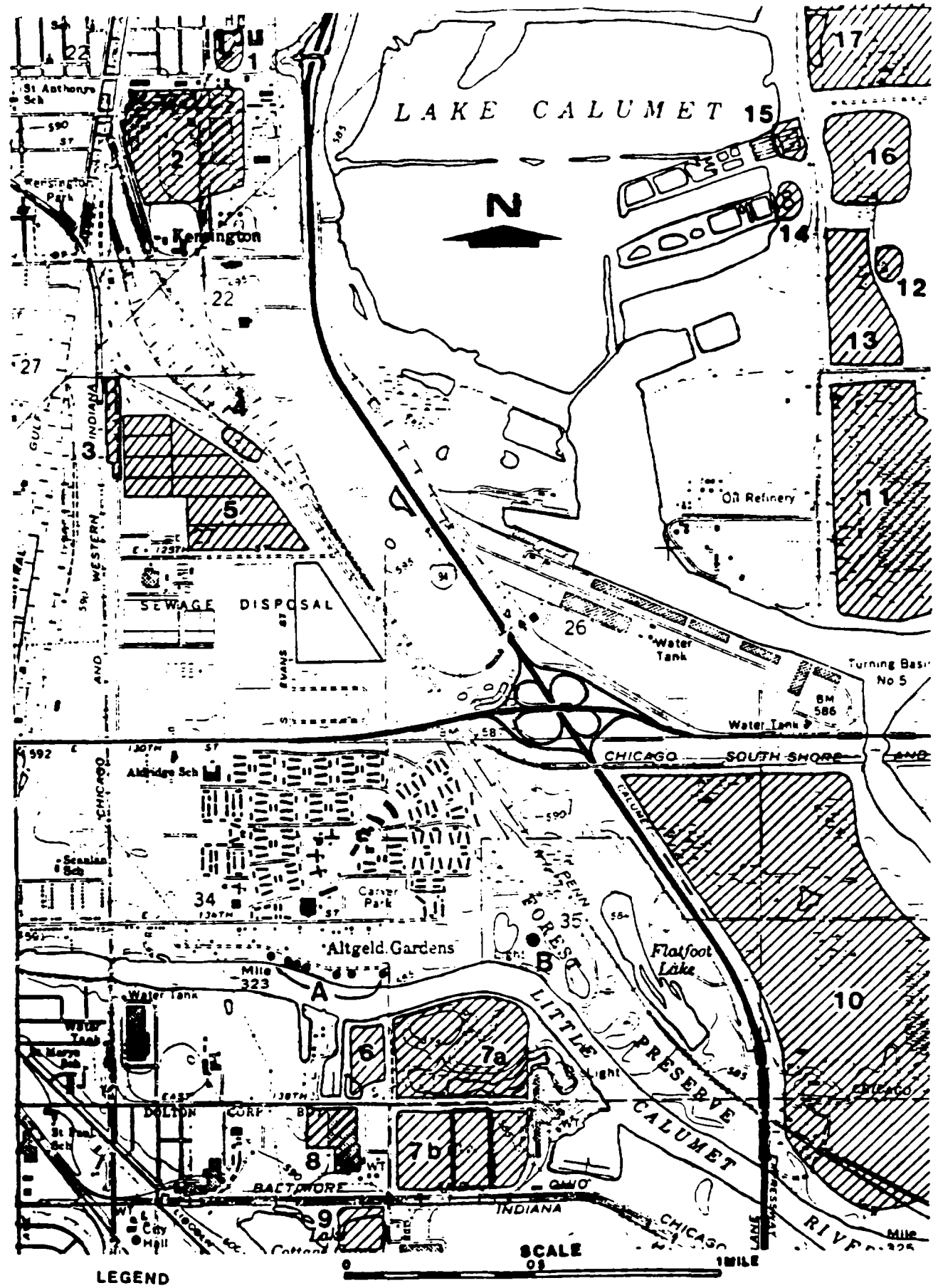

Figure 2–3
Waste Sites in Vicinity of U.S. Scrap
U.S. SCRAP

Table 2-1

Waste Sites in the Calumet Area
U.S. Scrap Site

Site Number	Site Name	Waste Type	Disposal Method
1	Liquid Dynamics	Hazardous Waste	Treatment Facility
2	Sherwin Williams	Heavy Metals Phenols	Treatment and Incineration
3	U.S. Scrap	Hazardous Waste	Illegal Dump
4	Penn Central	Hazardous Waste	Illegal Dump
5	MSD	Municipal Wastewater	Sludge Drying Facility
6	Cottage Grove Landfill	Solid Waste	Landfill
7a-b	Land & Lakes	PCBs, Organics & Inorganics	Landfill
8	McKesson	Solvents	Reclamation Facility
9	Dolton Municipal Landfill	Municipal Waste	Landfill
10	CID	Solvents, Organics & Inorganics	Landfill
11	MSD	Municipal Wastewater	Sludge Drying Facility
12	119th and Paxton	Special Waste	Illegal Disposal
13	U.S. Drum Disposal	Special & Hazardous Waste	Illegal Storage & Transfer
14	Chem-Clear	Special & Hazardous Waste	Treatment Facility
15	SCA Chemical Service	Hazardous Waste	Incinerator
16	Paxton II	General Refuse & Special Waste	Landfill
17	Interlake Landfill and Coke Plant	Hazardous Waste	Landfill

SITE HISTORY

During a period from 1908 to 1967, the U.S. Scrap site property was occupied by a malting plant which included several brick buildings and a set of eight concrete silos. Between 1938 and 1958, several sludge lagoons were constructed on MSD property directly east of the site. Prior to 1967, a large grain elevator and malting plant were demolished and the rubble from the demolition was used to fill the northern section of the site. This resulted in a "hill" of debris which raised the north end of the site to 18 feet above City of Chicago datum. The hill was later graded to the northeast to create a flatter surface.

Beginning in the late 1960's, disposal of industrial wastes began on the site. The reported operator, Mr. Steve Martel, allegedly utilized the site as a barrel reclamation facility. Wastes from reclaimable drums were poured into unlined excavated pits. Drums which were not reclaimable were buried in the excavated pits along with the industrial wastes.

An on-site incinerator, which is still present on the property, was supposed to have been utilized for waste disposal. Based on interviews with a former employee, it is believed that the incinerator was only used during regulatory inspections and only burned diesel fuel to give the appearance of a properly operating waste incinerator. The wastes were subsequently disposed of in on-site pits and onto railroad property to the west. This practice terminated in approximately 1975.

In 1980, the site came to the attention of the Illinois Environmental Protection Agency (IEPA). Inspections at that time revealed approximately 400 55-gallon drums of industrial wastes on the property, eight concrete silos one of which contained 13,000 gallons of liquid wastes, scattered piles of wastes, several lagoons and pits of wastes, and a considerable amount of sludge within on-site drainage swales.

In September 1980, under an agreement with the EPA, IEPA, MSD, and the City of Chicago, Mr. Martel removed the surface drums, the liquid within the

silos, and roughly 10,000 gallons of sludge from the drainage swales. Additional drainage swales were constructed along the east side of the property to prevent runoff onto MSD property. Recent attention has been drawn to the site due to underground fires which started at the site in the summer of 1985.

INVESTIGATIONS TO DATE

SITE INVESTIGATIONS

Presently, little is known about the quantity and type of contaminants found on site. In addition, data concerning the off-site migration of contaminants is incomplete. In the summer of 1980, the IEPA collected samples from a swale located on the east border of the site. Analysis indicated low levels of cyanide, chromium, lead, and nickel.

In 1981, the Illinois Attorney General (IAG) contracted STS Consultants to perform a hydrogeologic investigation of the U.S. Scrap site. Work began in the summer of 1981 and included soil borings, the installation of five monitoring wells and the collection of soil and surface water samples. This hydrogeologic investigation provided much of the data currently available.

On June 13, 1982, FIT performed a site inspection on the U.S. Scrap site. The object of the site inspection was to gain information to be used in scoring the site for possible inclusion in the National Priorities List (NPL). The site inspection was limited to sampling of surface water from ditches and swales. Subsequently, the site was ranked in accordance with the Hazard Ranking System and the site received a score of only 1.92 due to the lack of groundwater and surface water use in the area. Currently, a site must receive a score of 28.5 or greater to be included on the NPL.

On August 16, 1985, the Region V Technical Assistance Team (TAT) responded to a report of a subsurface fire on the U.S. Scrap site. A clay cap was placed over two burning areas, temperature probes were

installed, and infra-red photographs were taken until the fire was out. Other actions performed by TAT include fencing the site, performing geophysical work along the western boundry, and excavating a portion of the railroad embankment along the western boundry. Samples taken by TAT include an air monitoring program, an OVA survey, and soil gas testing. As part of TAT's responsibilities, it produced an investigation proposal to assess the site's impact on public health and the environment. The proposal was never implemented.

WASTE CHARACTERISTICS

The U.S. Scrap site was operated as a drum reclamation facility. Drums from a wide range of industries were accepted at the site. The contents of the drums were dumped into on-site pits, allowing the drums to be salvaged.

The site contains a variety of surface waste and seepage materials. The exact nature and quantities of contaminants present at the site are unknown. Samples of sludge collected by the IEPA during the summer of 1980, indicate low levels of cyanide, chromium, lead, and nickel. An OVA survey conducted by the TAT has documented that volatile organic compounds are present in several of the surface waste deposits and seeps.

Some sampling of subsurface soils has been done in and around the suspected pit locations. Boring samples were collected by STS Consultants and IEPA during the summer of 1981. These samples were taken during the installation of on-site monitoring wells. The locations of the monitoring wells are shown in Figure 2-4.

Analysis of the subsurface soil samples for select organic parameters revealed considerable levels of toluene, xylenes, benzenes, and other aromatic and aliphatic hydrocarbons. The results are shown in Table 2-2. The TAT collected another subsurface sample on August 17, 1985, after the fire had started. This sample indicated high levels of contamination both of organic and inorganic parameters.

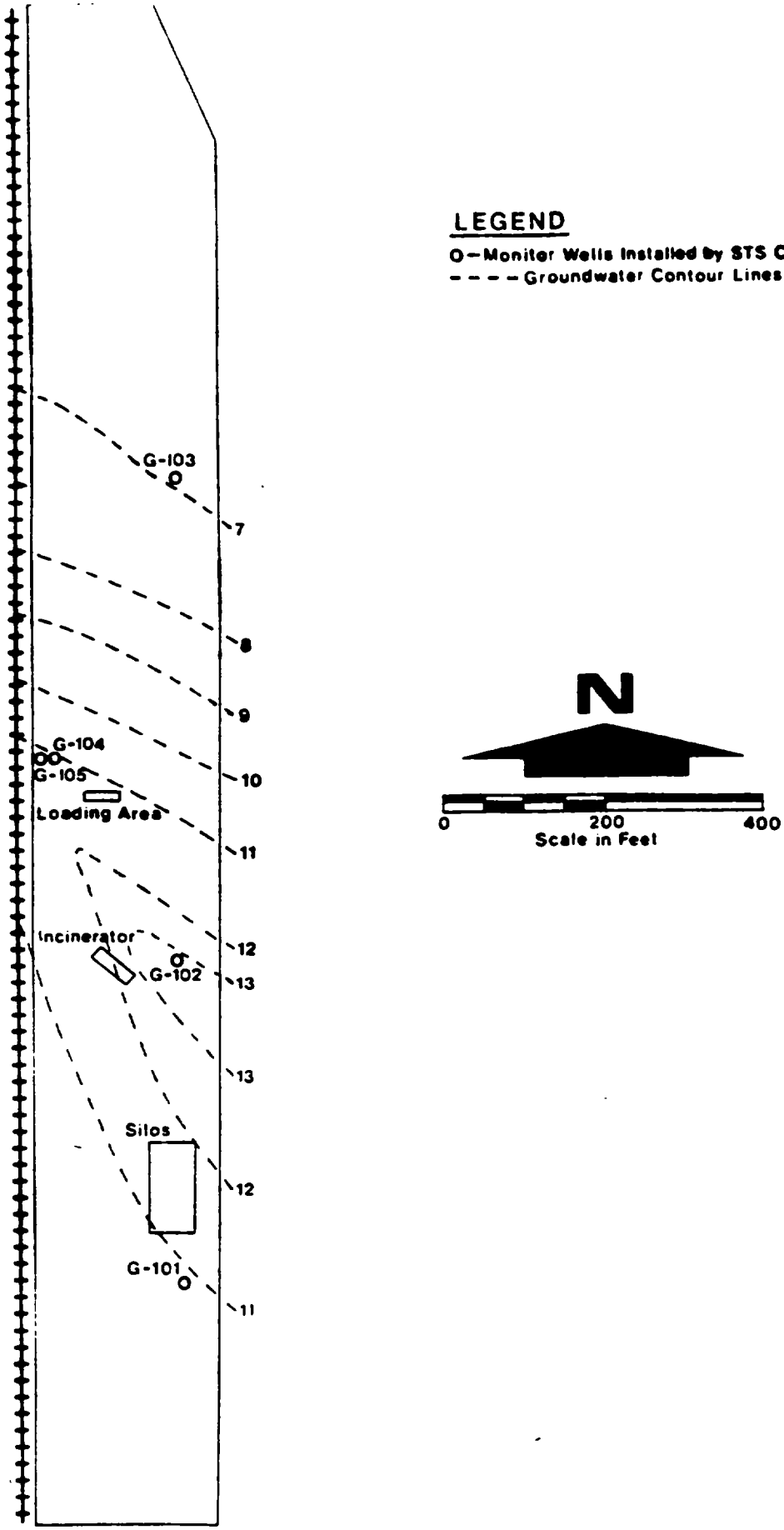

Figure 2-4
Current monitor well locations
U S Scrap

Table 2-2

Chemical Analyses of Soil Samples from Borings done at U.S. Scrap

Chemical Constituent (ppm)	Sample No.	CS101	CS112	CS111	CS110	CS131	CS133	CS132	CS102	CS103	CS104	CS100	CS117
	Boring No.	G-101	G-102	G-102	G-102	G-103	G-103	G-103	G-104	G-104	G-105	G-105	G-132
	Depth (ft)	7.5-9	2.5-4	4-6	6-7	0-1.2	5-7	10-11	5-7	7.5-9	0-1.5	2.5-4.5	12.5-14.5
Aliphatic Hydrocarbons		150	100	70	120	700	35	56	170	790		2,100	47
C_3-Benzene									390	560		2,600	
C_4 Benzene			57	12	19				95	560		1,900	
C_5-Benzene										55		450	
Napthalene									78	180		710	
Toluene		90							440	1,400		3,100	
Xylenes		360	320	18	39		230	76	2,200	3,300	20	6,000	
Ammonia		2.5	3.2	1.8	1.6				1.2				
Arsenic		<0.001	<0.001	<0.001	0.002				0.008				
Barium		0.1	0.0	0.0	0.0				0.0				
Boron		0.4	0.6	0.3	0.4				0.4				
Cadmium		0.00	0.00	0.00	0.00				0.00				
Chlorides		20	5	8	8				15				
Chromium (Cr tot.)		0.00	0.00	0.00	0.00				0.00				
Copper		0.00	0.00	0.00	0.00				0.03				
Iron		0.2	0.0	0.1	0.2				0.0				
Lead		<0.03	<0.03	<0.03	<0.03				<0.03				
Manganese		0.15	0.04	0.09	0.06				<0.01				
Mercury		<0.05ug/l	<0.05ug/l	<0.05ug/l	<0.05ug/l				<0.05ug/l				
Nickel		0.0	0.0	0.0	0.0				0.0				
pH (units)		7.6	7.9	7.6	7.9				8.4				
Phenols		6,200	0.043	0.068	0.063				0.770				
Phosphorus		0.02	0.02	0.03	0.03				0.03				
Selenium		<0.001	<0.001	<0.001	<0.001				0.003				
Sulfate		33.0	3	4	5				135				
Zinc		0.1	0.1	0.0	0.0				0.0				

Analyses performed by IEPA. Samples taken June, 1981

Based on interviews with past employees of U.S. Scrap, there is reason to believe that both shock sensitive and air reactive wastes may have been accepted at the site. These wastes are believed to be buried along the western boundry of the property. Pesticides may also be present in this area. These waste types were not found during the excavation of the western embankment that TAT performed during the autumn, 1985.

ENVIRONMENTAL SETTING

GEOLOGY

The underlying geology of the south Chicago area consists of four main groups. From the surface down, these are: (1) surface fill, (2) lake and marsh deposits, (3) glacial drift, and (4) sedimentry bedrock. The lake and marsh deposits and the glacial drift are interstratified due to the repeated advances and retreats of glaciers and ancient Lake Chicago.

The surface "fill" was used to fill in marshy areas and is not a natural deposit. Various types of fill were used for this purpose and ranged from construction debris to solid waste. Marsh and lake sediments are found below the fill material. The marsh sediments are usually dark and are highly organic. The lake deposits occur mostly as silty clays, but also occur as sands. These lake bottom sediments were deposited during the high-water levels of Lake Chicago during the Pleistocene Epoch. The majority of the deeper unconsolidated material is glacial till containing some lake bottom sediments. The till is described as a grey, calcareous, clayey and silty clay with small amounts of cobbles, pebbles, and boulders. Some sandy lenses occur but, for the most part the till is fine silty clay.

Niagran dolomite bedrock at a depth of 70 to 110 feet below ground surface is found beneath the till. The dolomite was initially deposited as limestone, on the bottom of a shallow sea, during the Silurian Period. The dolomite ranges from argillacious to silty and cherty and is found to be as thick as 500 feet in the Lake Calumet area. Below the dolomite,

Maquoketa Shale is found. This thick shale layer separates the dolomite from the underlying Ironton, Galesville sandstone formed during the Cambrian-Ordivician periods. The sandstone is found at a depth of 1500 feet below ground surface.

GROUNDWATER OCCURRENCE

There are three major zones of groundwater occurrence in the Lake Calumet area. The first is the fill and sand lenses which occur within and on top of the glacial drift. The second is the Niagran Dolomite aquifer, and the third is the deeper Ironton, Galesville sandstone aquifers. Water in the sandstone aquifers are available in sufficient volume for consumption, but the quality is below drinking standards and most local industries prefer to use Lake Michigan water.

The majority of the shallow groundwater in the vicinity of the U.S. Scrap site is found in the surface fill and glacial drift. This aquifer is known to be used by seven homes south of the site. These homes are located on 134th Place on the northern shore of the Little Calumet River. This is approximately 1 1/2 miles south of the site.

GROUNDWATER QUALITY

The report of a study conducted by the Illinois State Geological Survey entitled, "Preliminary Geologic Report on Seven Proposed Industrial Sites in Northern Illinois (September, 1980)", covers the area between 110th and 114th street and between Interstate 94 and the Northfolk and Western Railroad. It was determined that of the three aquifers present in the area, only the deepest, the Ironton, Galesville sandstone is capable of supplying 200 gpm. This aquifer is not of potable quality due to the natural mineral content of the water. It was the conclusion of the report that it is "unlikely, therefore, that contamination of any potable groundwater supply could occur from waste disposal related operations in the area."

The seven homes, currently using the shallow aquifer, have shown signs of groundwater contamination. At least two of these wells are contaminated with cyanide, benzene, and toluene as well as a number of other compounds. Two water fountains in the Beaubien Woods Forest Preserve, 1 1/2 miles southeast of the site, were sealed in 1985 due to methane contamination. The sources of the groundwater contamination have not been identified. The general areas around the homes and the preserve have been used for a number of disposal sites. Figure 2-4 shows the location of the affected wells and surrounding potential sources.

The U.S. Scrap site has 5 monitoring wells installed on site. Four of the wells are screened in the shallow aquifer located in the fill and glacial drift zone. Analysis of samples show this aquifer to be the most contaminated of the three water bearing zones and is the probable recepticle for the majority of liquid waste disposed of on site. The clay layer which separates the upper aquifer, has great potential to retard any downward vertical migration. Horizontal migration is not restricted and is the most soilible pathway for contaminates leaving the site. The last monitoring well is screened in the Niagran dolomite, and samples do not show high levels of contamination.

The possibility of cross contamination between aquifers will be addressed when a full field study of the wells and any other vertical structures which may act as a conduit for contaminates through the clay layer.

SURFACE WATER

A marshy area exists due west of the U.S. Scrap site. The marshy area is surficially separated from the site by a railroad embankment. A culvert running under the tracks was used to connect the site to the marsh area. This part of the marsh area was recently excavated by MSD. The Little Calumet River flows south of the site and is over 3000 feet away.

SURFACE WATER QUALITY

A report prepared by the U.S. Department of Health, Education and Welfare (HEW) in 1965 listed the Little Calumet River as severly polluted. However, the surface water quality in the area has improved in recent years. Area residents now fish the Little Calumet River and desirable commercial and sport species are just starting to return (Colton, 1985).

The extent of contamination in the marsh area west of the site has not been studied at this time. File reports indicate dumping of hazardous waste into the marsh may have occurred. Samples taken of the soil from the railroad embankment leading to the marsh show elevated levels of organics and PCBs. Sample locations are shown in Figure 2-5. The data are shown in Tables 2-3 and 2-4.

AIR QUALITY

The extent of air releases of contaminants at the site has been monitored fairly extensively. Monitoring of the smoke venting from the underground fire indicated the presence of a variety of organic and inorganic constituents. These constituents are shown in Table 2-5. Periodic measurements taken at the industrial and residential areas around the site have revealed no detectable levels of fire generated contaminants reaching these areas. The location of the air monitoring stations are shown on Figure 2-6.

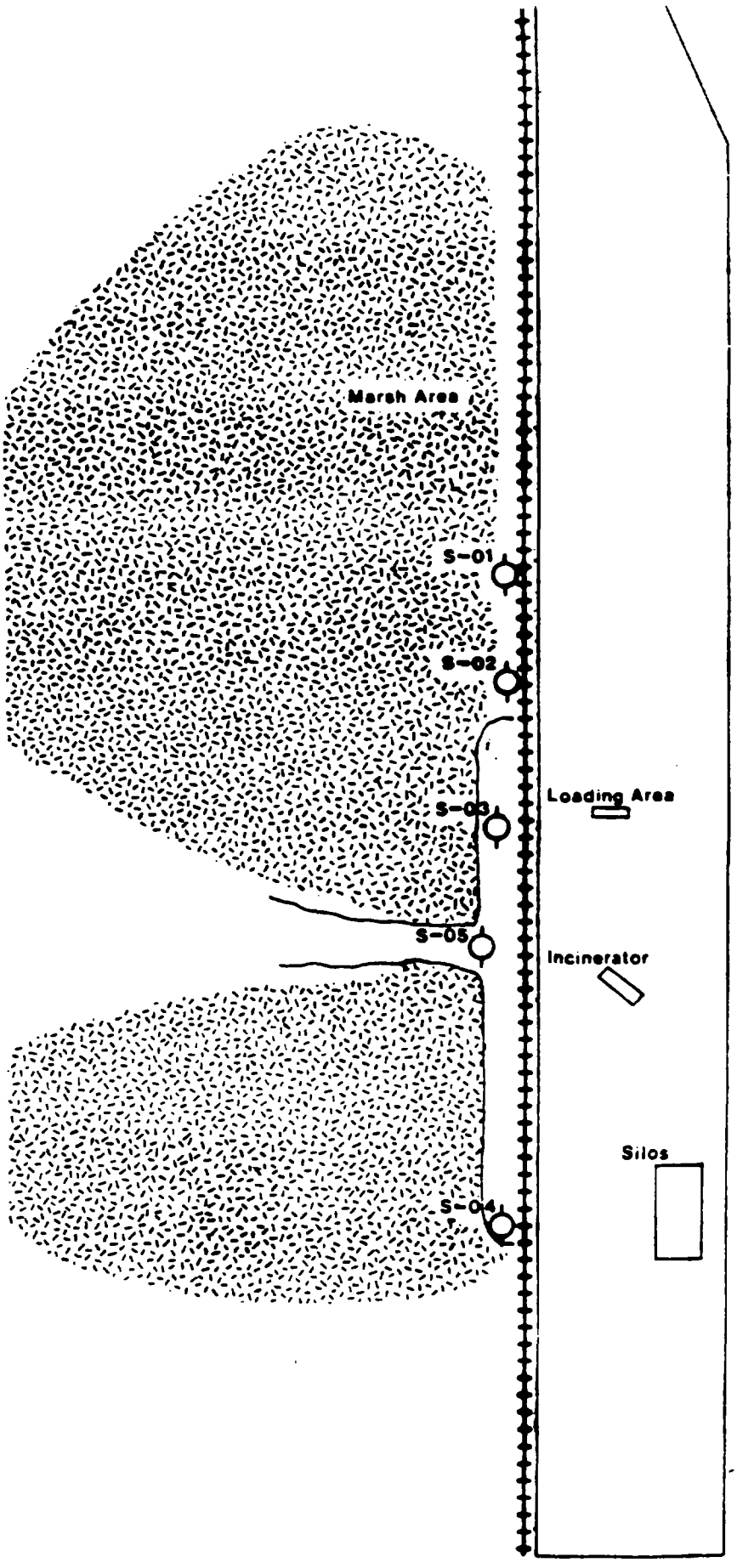

Figure 2-5
Soil sample locations
U.S. Scrap

TABLE 2-3

Organic Analyses of Soil Samples from West Side of Railroad Embankment

Sample ID	Parameter	Concentration ug/g	Detection Limit ug/g
STA-01	1,1-dichloroethane	.60	.11
	1,1,1-trichloroethane	.82	.11
	1,2-dichloropropane	.21	.11
	Bromoform	1.6	.11
	1,1,2,2-techtrachloroethane and/or tetrachloroethene	1.4	.11
	Toluene	7.0	.11
	Chlorobenzene	1.8	.11
	Ethyl benzene	5.5	.11
STA-02	None detected	--	2.0
STA-02	Methylene chloride	3.8	.20
	1,1,1-trichloroethane	.17	.20
	Toluene	.72	.20
	Ethyl benzene	.47	.20
STA-03	Bromodichloromethane	9.1	2.0
	Bromoform	11.	2.0
	Toluene	3.9	2.0
STA-04	1,1,1-trichloroethane	5.9	2.0
	Carbon tetrachloride	3.0	2.0
	Bromodichloromethane	3.5	2.0
	Trichloroethylene	4.0	2.0
	Benzene	6.5	2.0
	Toluene	78.	2.0
	Ethyl benzene	68.	2.0
STA-05	None detected	--	2.0
STA-05 Dup.	None detected	--	2.0

TABLE 2-4

PCB Analyses of Soil Samples from West Side of Railroad Embankment

Sample No.	Aroclor	Concentration (ug/g)
STA-01	1254	1414
	1260	890
STA-02	1254	2274
	1260	1374
STA-03	--	None detected
STA-04	1254	134
	1260	194
STA-05 (Not Homogenized)	1254	42.2
	1260	27.8
STA-05 Dup. (Not Homogenized)	1254	None detected
	1260	18.6
STA-05 (Homogenized)	1254	21.9
	1260	10.1
STA-05 Dup. (Homogenized)	1254	24.2
	1260	12.6

Analyses performed by Enviresponse, INC. Samples taken October, 1985.

Table 2-5

Evaluation of Smoke Leaving Venting Holes During Fire
U.S. Scrap Site

Substance Tested For	Findings
Organics	50-80 ppm
Hydrogen Sulfide	15 ppm
Hydrochloric Acid	2 ppm
Hydrogen Cyanide	positive

(1) Reading taken approximately 6 inches above the ground.
(2) Readings taken by EPA on August 16, 1985.

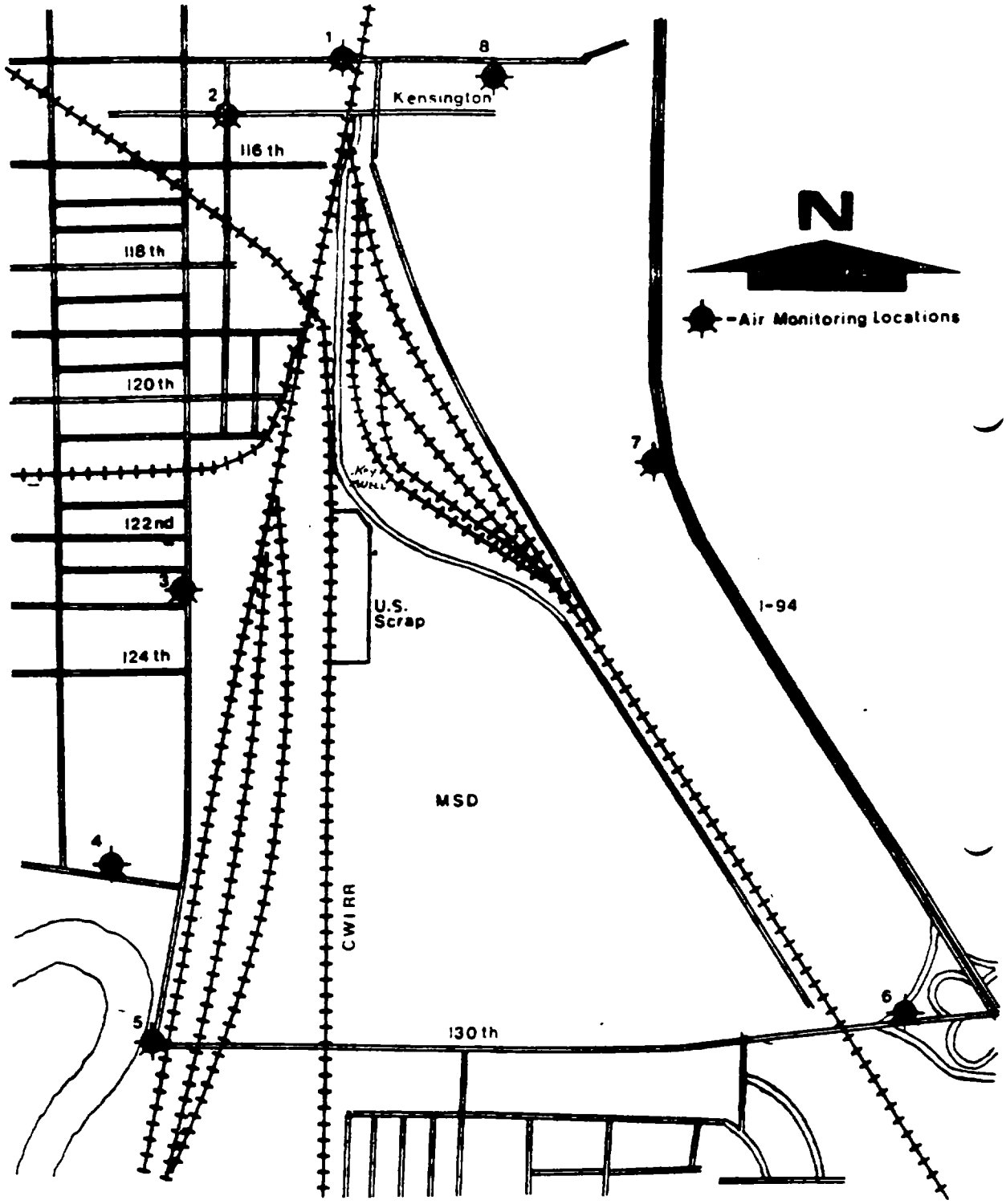

Figure 2-6
Air monitoring locatio is
U.S. Scrap

DATA LIMITATIONS

The following data limitations have been identified for the U.S. Scrap site:

- Waste characterization and quantities are poorly documented.
- The extent of surface soil and subsurface soil contamination is unknown.
- The nature and extent of off-site contamination is undefined.
- The extent of vertical and lateral contamination of the groundwater from the site, with respect to existing groundwater contamination, is unknown.
- Surface water and groundwater relationship is unknown.
- The threat of reignition of on-site materials is not known.
- The hazard the site poses to the health of the surrounding population and environment has not been assessed.

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SECTION 3
SCOPE OF WORK

The primary objectives of the SIF are to determine the contamination problem caused by the U.S. Scrap site and to assess the hazard the site poses to the health of the community and the environment. The risk to the population will be determined by the potential effects of off-site migration of contaminants from the U.S. Scrap site.

At the present time, the available data on the U.S. Scrap site are insufficient to allow an accurate hazard assessment of the site without the additional work detailed in the following tasks.

A scope of work was developed to address the data requirements for the SIF objectives. The scope of work proposed for the SIF includes the following five tasks:

Task 1. Preparation for Field Investigations
Task 2. Conduct Field Investigations
Task 3. Evaluation of Investigation-Derived Data
Task 4. Public Health and Toxicological Assessment
Task 5. SIF Report

Goals for the U.S. Scrap site SIF include:

- Assess the impact of the contamination on the area's groundwater;
- Determine the extent of contamination that has occurred in the neighboring marshy area;
- Assess levels of soil contamination that may be present on or offsite;
- Identify specific contaminants posing acute or chronic hazards to public health, welfare, or the environment; and

- Identify the pathways of contaminant migration from the site and potential receptors.

It is not the goal of the SIF to identify activities to eliminate every data gap or area of uncertainty uncovered during the evaluation of existing data. Instead, the SIF work plan focuses on gathering the specific information necessary to evaluate the risk to the public's health, welfare, and the environment due to the site. The Scope of Work is a flexible document that can be expanded, reduced, or eliminated based on data gathered during the project. Any change in scope will be reviewed with the EPA to ensure that concerns other than the technical needs of the project are being addressed.

TASK 1 - PREPARATION FOR FIELD INVESTIGATION

The goal of this task is to define the detailed scope of work for the SIF and to develop sufficient background information to allow an effective implementation of the recommended investigation.

During this task, the following subtasks will be completed:

- Conduct initial site health and safety assessment
- Data gathering
- Prepare and submit quality assurance project plan (QAPP)
- Prepare and submit sampling plan
- Prepare and submit final work plan
- Obtain permits and rights of entry

Subtask 1.1 Conduct Initial Site Health and Safety Assessment.

An initial site inspection will be conducted by the project team to become familiar with the physical state and layout of the site and its surroundings. Based on available information, a site health and safety plan (H&SP) will be prepared by FIT for the initial site visit. During this visit, FIT personnel will conduct a

thorough inspection of the entire site using appropriate monitoring equipment such as a radiation detector, explosimeter, Draeger tubes oxygen meter, and organic vapor analyzers with photoionization or flame ionization detectors. This equipment will be used to obtain sufficient data to evaluate the potential for adverse health effects from chemical exposure levels in the area. Based on data generated in the assessment, a site H&SP for future site activities (e.g., sampling) will be prepared by FIT.

Subtask 1.2 Data Gathering

A detailed data search will be performed by FIT to compile available site information, beyond what has already been collected. Additional maps, historical photographs, well logs, geologic, soils, surface water and groundwater data, and reports (both published and unpublished) will be collected. Available private, residential, commercial, and industrial wells within the immediate area of the site will be inventoried. Some sources of additional data may include USGS, Soil Conservation Service (SCS), IEPA, National Oceanographic and Atmospheric Administration (NOAA), local health department, local well drillers, the City of Chicago, and the MSD. In addition, legal descriptions of the site boundaries and the boundaries of adjacent properties will be collected from Cook County records. These descriptions and the names of current property owners will be required to obtain rights of entry for the field investigations (subtask 1.6). Well casing elevations will be surveyed at the conclusion of well installation program.

Subtask 1.3 Prepare Sampling Plan

A sampling plan will be prepared for inclusion in the QAPP. It will cover the sampling efforts described in the draft work plan and will address the following specific topics:

- Sample types, tentative locations, and costs

- Sampling equipment and procedures

- Sample handling, custody procedures, and preservation

- Sample documentation

- Sample shipping

- Analytical arrangements

- Sampling team organization, responsibilities, and training

Copies of the draft sampling plan will be provided to the EPA and other appropriate project personnel for review and comment. Upon receipt of written review comments, the draft sampling plan will be revised and issued for incorporation into the QAPP.

Subtask 1.4 Prepare Quality Assurance Project Plan

A draft site-specific study quality assurance project plan (QAPP) will be developed that incorporates, by reference, the appropriate portions of the REM/FIT Quality Assurance Manual. The plan will include the needs specific to the work assignment and complies with EPA's "Interim Guidelines and Specifications for Preparing Quality Assurance Project Plans" (OAMS-005/80). The QAPP will be issued as a separate document following approval of the work plan.

The draft QAPP will include specific references regarding the sampling plan. The sampling plan describing the specific sampling program will be prepared and will be added to the QAPP as an appendix. The QAPP and the sampling plan are subject to revision and updating on an as-needed basis. All proposed changes will be approved by the EPA.

Subtask 1.5 Work Plan

This SIF Scope of Work was prepared for submission to the EPA based on readily available information and incorporates the activities necessary to gather the data required to complete the SIF objectives.

A draft work plan will be prepared based on information obtained in Subtask 1.1 through 1.4 and will be submitted to the EPA for approval prior to initiating Task 2 activities.

In addition, technical specifications and contracting documents will be prepared for the drilling, casing, and developing of the monitoring wells identified in the sampling plan and the QAPP. These will be submitted with the work plan.

Subtask 1.6 Permits, Rights-of-Entry and Authorization

With the assistance of the EPA, FIT will obtain all permits, rights-of-entry, and authorizations required for the field investiations.

TASK 2 CONDUCT FIELD INVESTIGATIONS

The goal of this task is to define the nature and extent of on-site and off-site contamination. To accomplish this, the following subtasks are recommended:

- Establish Field Office
- Surveying and Mapping
- Perform Soil Investigation
- Perform Surface Water/Sediment Investigation
- Perform Hydrogeologic Investigation
- Drum Sampling

Samples collected during these investigations will be analyzed for:

- pH and temperature (field measured - liquid samples only)
- Conductivity (field measured - liquid samples only)
- Organic analysis package available from the U.S. EPA CLP
- Inorganic analysis package available from the U.S. EPA CLP

No off-site air monitoring will be performed. Extensive air sampling was performed by Region V TAT (Weston) during August, 1985 when the site was on fire. No contaminants were detected at any of the monitoring stations along the perimeter or in the nearby housing areas. These samples were taken during the conditions most likely to cause a release. Additional samples were taken during the excavation performed by Region V TAT. Again, nothing over background was detected.

Air monitoring will be performed by FIT personnel during sampling, excavating, and drilling operations for use in evaluating levels of personal protection. The HNU and Foxboro OVA will be used to measure total organics and the portable gas chromatagraph will be used for real time analysis and identification of airborne contaminants.

Subtask 2.1 Establish Field Office

A decontamination area and an office trailer will be supplied on site for use by all field personnel during the SIF. The office trailer will be used as an on-site command post for equipment storage, management of field investigations, sample paperwork, off-site communications, and shelter. The office trailer will include telephone and electricity hook-ups.

Subtask 2.2 Surveying and Mapping

The objective of this subtask is to develop a topographic map showing elevations and locations of all pertinent physical features of the site. Such information is necessary for conducting the field investigations described in this work plan and any further investigation or response which may occur in the future.

2.2.1 A legal description of the property boundary will be researched in Cook County records and verified in the field to the extent that existing definition of site boundaries is incomplete or suspected to be inaccurate. The intent is not to perform a property boundary survey but to confirm boundaries so that subsequent site investigations or responses will not carry over into neighboring properties without appropriate permission.

2.2.2 A topographic survey of the property will be performed to determine horizontal distances of physical features to the property boundaries and vertical elevations relative to National Geodetic Vertical Datum (mean sea level). Two maps will be produced. The first map will be produced with a scale of 1 inch=200 feet for the project area as a whole. The limits of the map will be determined in the final work plan (Subtask 1.5). The second map will be produced with 2-foot contours and a scale of 1 inch=50 feet for the site itself (approximately 2000' x 400'). The horizontal and vertical

control accuracy for these topographic maps should be, at a minimum, fourth order plane surveying.

Well casing elevations for new and existing monitoring wells will be surveyed during the field investigations.

FIT will perform the site surveying and mapping, and will incorporate all available maps, aerial photographs, legal descriptions or other pertinent data to accomplish the task.

Subtask 2.3 Perform a Soil Investigation

The objective of sampling and analyzing the soil on and around the site is to collect data on the type, areal extent, concentration and origin of hazardous chemicals in the study area. The soil sampling activities will be divided into two phases; the first phase will include on-site and off-site surface soil sampling and the second phase will include the excavation of on-site test pits with subsequent subsurface soil sampling.

The purpose of the first phase is to determine the areal extent of surface contamination. The surface of the entire site and the immediate area surrounding the site will be characterized. Samples will be taken from the top twelve inches of soil at each sample location. The site will be divided into 54 100-foot square grid blocks. From alternating grid blocks, 27 composite surface soil samples will be collected for CLP organic and inorganic packages. If sample locations are covered by the clay cap, samples will be taken from just below the clay when possible. When not possible, the sample location will be omitted from the composite sample. This decision will be made by the FIT project manager and the OSC. In addition, two background, three duplicate, and three blank samples will be collected and analyzed. The locations of the on-site surface soil samples are shown on Figure 3-1 and labelled SS-01 through SS-27.

Ten off-site surface soil samples will be collected. The locations of the sampling points are shown on Figure 3-1 and labelled SS-28 through SS-37. In addition, one duplicate and one blank sample will be collected. The samples will be analyzed for CLP organic and inorganic packages.

The second phase of sampling sursurface soils will define the depth and concentration of hazardous constituents at suspected source areas. A total of five excavations (test pits) will be performed. Two of the test pits will address previously burning areas which are alledgedly 40-feet deep. These areas received sludges and industrial wastes along with reports of "Lab Pack" containers. The remaining three pits will be shallow (ten feet deep or less) and will address the center of the site which may have several storage tanks buried on it. The locations of the test pits are shown on Figure 3-2.

The excavations will be performed with a Catepillar 225 track hoe with claw-type bucket or a machine of similar capabilities, equipped with an enclosed cab, bottled air for level B protection for the operator, and an explosion shield. Excavation will be performed by removing the clay caps (where found) and removing fill material from predetermined locations. All materials removed will be placed on the surface for sampling. Subsurface soil samples will be collected at approximately 5-foot intervals in each pit. For the five feet pits, 27 subsurface soil samples will be collected and analyzed for CLP organic and inorganic packages. In addition, five duplicate and five blank samples will be collected (one from each test pit).

All excavation derived materials will be used as backfill and the clay caps will be returned to their original state.

In the event a container or drum is found, its location will be noted and it will be removed by a grappler on the backhoe, then brought to the surface. The drum will be placed in an overpack drum taken to a on-site staging area and prepared for sampling (see Subtask 2.6).

Supplies for the control of fire or chemical reaction will be on site during excavation. These will include dry fire extinguishing chemicals, lime and clay. The local fire department will be informed when any excavation work is to be done. To detect any air release during operations, a HNU and OVA will be operating on site.

The sampling proposal detailed above will result in 84 samples being taken (including duplicates and backgrounds). Of these, the 47 surface samples will be sent as low-level contamination samples and the 37 subsurface samples will be sent as medium concentration samples.

SPECIAL PROBLEMS

The U.S. Scrap site has many factors which may inhibit or prevent the excavation of deep test pits. The subsurface conditions include a high water table, demolition debris, and the possibility of a smoldering underground fire. The excavation of a 40-foot deep pit would require the use of a claw type bucket and the establishment of terraces in the pits to place the back hoe deeper and allow the 20-foot extender arm to reach a depth of 40-feet. The high water table would require continuous dewatering techniques to remove the vast amounts of water from these pits. This type of excavation would be twenty to thirty feet below the sludge/water table and would result in drawing contaminated groundwater into the pit. The removal, staging and disposal of this water would be an lengthy and costly task. The resulting safety problem would require a increase in manpower and subcontractor usage. This type of operation is more in line with a remedial action and may be beyond the scope of this SIF. Therefore, the two main pits will be excavated to a depth ranging from 10-feet to 40-feet. The actual depth will be based on field conditions and will be determined by the FIT project manager and the OSC.

Subtask 2.4 Conduct Surface Water/Sediment Investigation

The purpose of this task is to determine to what extent the wetland area west of the Chicago and Western Indiana Railroad tracks has been impacted by the waste disposal practices at U.S. Scrap. Both water and sediments from the wetlands will be collected and analyzed to determine the extent of contamination. Sediment and surface water samples will be taken at the same locations, and these locations are shown on Figure 3-3. Six surface water and six sediment samples will be collected and are labelled SW-01 through SW-06 and WS-01 through WS-06, respectively. In addition, one duplicate and one blank will be collected for the surface water and for the water sediment. Due to ongoing MSD excavation activities and the availibility of surface water in this area, the extent and location of the surface and water sediment investigation may be modified.

Subtask 2.5 Perform Hydrogeologic Investigation

The objectives of this subtask is to conduct a hydrogeologic investigation that will:

- Provide hydrogeologic data to assess potential off-site migration of contaminants which may endanger the surrounding population.

- Provide data to determine the nature of groundwater contamination and delineate the present horizontal and vertical extent of contaminant plumes.

Open Hole Investigation

During an on-site inspection of U.S. Scrap an open hole was identified by FIT personnel. At the surface, the hole is cased with a 10-inch diameter pipe and its depth was measured to be 45 feet. This may be an old production well used by the malting operation. A determination of the dimensions and origins of the hole and whether it can incorporated into the proposed mointoring will be made.

Conduct A Soil Gas Survey

A soil gas survey will be performed on the portions of U.S. Scrap site which has not been covered by the EPA Survey (September 1985). These areas include the east half of the site and the perimeter. This survey will not be as detailed as the EPA Survey (September 19, 1985) with respect to amount of samples and detailed analysis.

Total organics and specific compounds will be tested for by using the HNU, OVA 128, and a portable gas chromatagraph (GC). The application of a soil gas survey at U.S. Scrap will have a dual purpose. First the data will aid in identififying high contamination areas on and off-site. This information will be a main factor in choosing sampling and monitoring well sites. Secondly the gathered data will influence the safety levels and provide advance information about compounds which may be released during soil borings and excavations.

The survey will be performed prior to well installation and test pit excavation. Two methods will be utilized for gas sampling. A hand held soil auger will be used to open a two 2-foot deep hole which will be covered for a predetermined length of time. The gas which will collect in the hole will be sampled by the HNU, OVA, or air bag for the portable GC. The second method will utilize a well point sampler to collect samples at various depths.

Groundwater Monitoring Network

The groundwater monitoring network will be designed to identify the local and regional flow characteristics and provide information on the type and concentration of contaminants present in the two aquifers below the site. The MSD ponds are unlined and provide a artifical groundwater recharge zone which directly influences shallow groundwater flow through the U.S. Scrap site.

The regional groundwater flow in the Lake Calumet area is west to east (toward Lake Calumet and Lake Michigan). The groundwater mound generated by the MSD ponds (located east of the site) tends to reverse the regional groundwater flow by pushing shallow water to the west under the U.S. Scrap site. After the water has passed under the site it merges with regional flow and travels toward Lake Calumet. To confirm this theory, well placement will be designed to monitor all pertinent interactions and flow directions, both local and regional.

Installation of Monitoring Wells

Data on the design, location, and construction of the on-site monitoring wells and other local wells will be identified and evaluated. These data include existing test and monitoring wells and construction records of local wells in the area. The status of the existing monitoring wells will be examined to determined whether they can be incorporated into the proposed monitoring network.

Fourteen new monitoring wells will be installed at the nine locations shown in Figure 3-4. Drilling and well design will be done per existing EPA, State of Illinois, and local regulations. Estimated drilling depths are 7 to 15 feet for shallow and 50 to 65 feet for deep wells.

Based on the specifications and contracting documents developed in Task 1, bids will be obtained from qualified contractors before awarding a contract. A geologist, hydrogeologist, or geotechnical engineer will be on site to ensure that the subsurface borings are logged and the wells are properly installed.

The boreholes for each well will be drilled using hollow stem augers when drilling in soil when possible. Four-inch minimum inside diameter auger flights will be used. Deeper wells may require rotary methods of drilling.

When drilling each well, samples will be collected for grain size analysis, index testing, and lithology analyses. At locations where more than one new well is to be constructed, formation samples will be collected from the deepest borehole in the cluster.

Split spoon samples will not be taken in the fill area (approx. 10 feet below grade). Characterization of these areas will be covered by the test pit samples, logs, and separate soil borings. When borings are below the fill, 18-inch split spoon samples will be taken every 5 feet. Continuous sampling augers will be used if field conditions demand it.

Approximately five Shelby tube and 20 split spoon samples will be collected and analyzed for pemeability and grain size.

Chemical analysis of soil boring samples will be limited to the boring samples that exceed a specified contamination screening test. At each general boring location, the soil samples will be screened using the OVA or Photovac (GC). Those soil samples that are suspected of being contaminated will be packaged for analysis. Approximately 20 samples will be analyzed for CLP organic and inorganic packages. In addition, two blank and two duplicate samples will be collected.

The wells will be constructed of 2-inch inside diameter flush joint threaded PVC pipe fitted with an 5-10 foot length of slotted PVC screen. The length of screened section will be determined in the field. A gravel pack will be installed around the screen and topped with 1-foot of sand. A bentonite slurry will then be placed by means of a tremie pipe from the top of the sand to about 10 feet below the ground surface to seal the annulus. The remainder of the hole will be grouted with neat cement and a 4-inch diameter protective casing with locking cap will be installed. Each PVC riser will be fitted with a slotted cap to permit the venting of gases and equilibration to atmospheric conditions (See Figure 3-5).

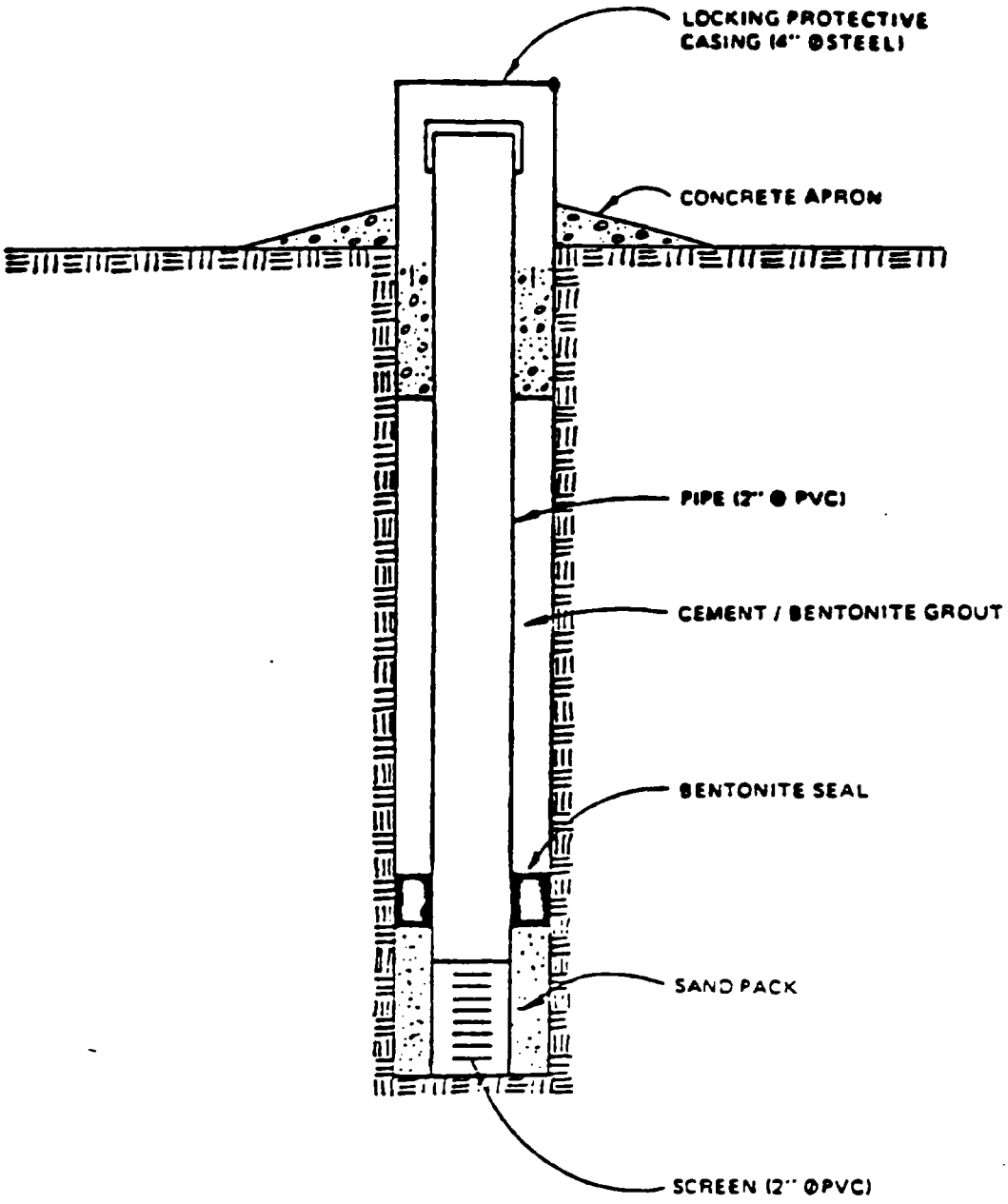

Figure 3—5
Monitor Well Construction
U.S. Scrap

Wells will be developed by either surging or air lifting to establish good hydraulic connection with the surrounding formation. Water levels will be allowed to equilibrate over a suitable time period and measurements of static water level will be taken.

Aquifer response tests will be performed on newly installed monitoring wells. The rising head method will most likely be used. It consists of withdrawing a volume of water from the well, causing the water level to fall. The subsequent rise in head is measured as a function of time. Upon plotting these two variables, the value of the hydraulic conductivity at that particular point in the aquifer can be obtained. Such information is useful in estimating groundwater flow velocity and rates of contaminant migration. For cost estimating, it is assumed that aquifer response tests will be conducted in all new monitoring wells.

Typical procedures to be followed during this subtask are presented below; however, site specific conditions will be considered before constructing the wells.

- Drilling tools, equipment, well materials, and rig will be steam cleaned before entering the site.

- Drilling tools and equipment will be steam cleaned between each boring.

- Split spoon samplers will be decontaminated between each use.

- All drill cuttings and wash water will be contained on site.

The exact numbers and locations of monitoring wells will not be determined until the preliminary investigation tasks are completed. For cost estimating and scheduling purposes the following are assumed:

- Fourteen monitoring wells will be constructed, requiring approximately 500 feet of soil boring and 35 feet of bedrock coring.

- Approximately 500 feet of PVC casing and 14 5-foot to 10-foot screens will be required.

- Approximately 93 feet of soil sampling at 5-foot intervals will be required, yielding 62 samples of which 24 samples (est.) will be analyzed.

- One rig and a three-person drill team will be required.

- One steam wash unit will be needed for washing drilling tools and equipment.

- Well installation will be performed by a qualified subcontractor.

- Level D, C, or B health and safety requirements will be used during all drilling activities.

- At an estimated production rate of 50 feet of drilling per day, the drilling program will take approximately 15 work days to complete. This includes mobilization, decontamination, and demobilization time.

- Twenty soil boring samples will be analyzed for chemical contaminants.

- Five Shelby tubes and 25 split spoon samples will be tested for physical properties and permeability.

Sampling and Analysis of Groundwater

Samples will be collected from all existing and proposed groundwater monitoring wells. The proposed monitoring wells will be allowed to equilibrate over a suitable period of time following development and hydraulic conductivity testing. Static water levels will be recorded at all wells before any sampling activity. The wells will then be equipped with dedicated Teflon tubing and Teflon or stainless steel bailers to eliminate the potential for cross-contamination and the need to decontaminate sampling equipment between wells. When practical, a minimum of 3 bore volumes of water will be purged from each well before collecting. Samples will be collected using the Teflon or stainless steel bailer.

One round of sampling will be performed after the completion and development of monitoring wells. The five existing monitor wells, the fourteen proposed monitoring wells, and the bore hole will be sampled and analyzed for CLP organic and inorganic packages, yielding 20 samples. In addition, two duplicate and two blanks will be analyzed.

The water level monitoring program is needed to define short-term changes in the water table gradients in the vicinity of the site and to assess surface water-groundwater relationships. Groundwater gradients and quality may vary greatly with changes of the water table elevation and changes in surface water stages. Water levels will be measured using a steel tape or an electric water level indicator. Measurements will be made to the nearest 0.01 foot. Proper decontamination procedures will be observed. At a minimum, three water level measurements will be taken during the SIF activities.

Special Problems

Wells placed in the deep aquifer will be double cased during borings to prevent cross contamination between the upper and lower aquifers.

No drilling will be done on-site, due to hazards and the amount of information already available. Off-site drilling increases overall safety and lessen the chance of encountering buried drums. A portion of the off-site wells will be placed directly adjacent to the site perimeter. These well sites will be cleared with a quick geophysical survey to locate any potential subsurface obstructions.

Monitoring wells are proposed for the marsh area west of the site. The weather conditions may cause the ground surface to be soft and special drill rigs may be required. Drilling and working platforms may be needed to support the workers, and these will have to be constructed before drilling operations can begin.

Subtask 2.6 Drum Opening and Sampling

Drums exposed during the pit excavations will be removed from the pit with a drum grappler, placed in overpacks, and moved to a bermed staging area at the discretion of the OSC and the FIT project manager. Selected drums will be sampled for the full range of organic and inorganic parameters after all of the excavations are completed. For budget purposes, 25 drums will be removed from the pits and 10 will be sampled and analyzed for CLP organic and inorganic packages. These samples will be rated as high hazard.

Subtask 2.7 Task 2 Technical Memorandum

After the completion of Subtasks 2.1 through 2.6, a technical memorandum will be written and submitted to the EPA. The technical memorandum will describe the field activities performed and the data gathered in Task 2. All chemical sample analysis will be presented in the Task 3 Technical Memorandum.

TASK 3 - EVALUATION OF INVESTIGATION-DERIVED DATA

The purpose of this section is to review the analytical results from the samples taken during Task 2, and to assess the potential migration of contaminants from the site. The following subtasks are proposed:

- Identification of Impact Zones
- Presentation and Discussion of Sample Results

Subtask 3.1 - Identification of Impact Zones

To assess the contaminants and their associated health risk, the site and surrounding area will be divided into impact zones. These impact zones enable the discussion of relative risk due to the migration of contaminants from the site. The following impact zones are proposed for the site and surrounding area:

- Zone 1: Groundwater
- Zone 2: Air
- Zone 3: Surface Soils
- Zone 4: Subsurface Soils
- Zone 5: Marsh Area West of the Site (Sediment and Surface Water)

Subtask 3.2 - Presentation and Discussion of Sample Results

In this subtask, tables of the analytical results will be presented for each impact zone. The concentration and distribution of the contaminants found will be discussed.

Subtask 3.3 - Task 3 Technical Memorandum

A technical memorandum summarizing Task 3 will be prepared and submitted to the EPA upon completion of the above subtasks. The memorandum will include analytical results and identification of the impact zones.

TASK 4 - PUBLIC HEALTH AND TOXICOLOGICAL ASSESSMENT

The goal of this section is to evaluate the hazard presented by the contaminants found at the U.S. Scrap site and to address the risk these contaminants pose to human health, welfare, and the environment. The following subtasks are recommended:

- Toxicological Evaluation
- Technical Memorandum

Prior to initiating the subtasks, FIT will submit to EPA a detailed outline for the toxicological evaluation and technical memorandum. After EPA approval, FIT will proceed with the subtasks.

Subtask 4.1 - Toxicological Evaluation

This section will provide a detailed qualitative and semi-quantitative toxicological evaluation of the various chemicals found at and around the site. Sample results will be evaluated and/or extrapolated based on drinking water criteria or standards set by the EPA (Safe Water Drinking Act and the Clean Water Act - Water Quality Criteria for Human Health), air exposure recommendations from the American Conference of Governmental Industrial Hygienists (ACGIH) and federal OSHA air standards, and any other pertinent toxicological data obtained from research.

Subtask 4.2 - Task 4 Technical Memorandum

The conclusion section will use the toxicological evaluations to determine the hazard to human health, welfare, and the environment, generated by the U.S. Scrap site for each impact zone. It will include contaminants found, comparison to the surrounding area, and comparison to the health standards set by the respective governing body.

TASK 5 - SIF REPORT

A draft SIF report will be prepared to consolidate and summarize the data collected during the SIF. The report will consist of technical memoranda supplemented by discussions of data and topics not previously discussed in the technical memoranda. This format will satisfy Region V ERRB project goals. The draft report will be submitted to the EPA for review and comments. After receipt of written comments from the EPA, a final report will be prepared and submitted to the EPA.

SECTION 4

SCHEDULE

The proposed master project schedule is shown in Figure 4-1. The project deliverables and anticipated dates of submittal are listed in Table 4-1. The schedules commence after receipt of written notice to proceed (NTP).

FIT will perform its tasks in an expeditious manner. The time estimates presented in Figure 4-1 are based on FIT experience. In particular, the writing, review, and approval of a QAPP can require from twelve to fourteen weeks. Analytical results are usually received three to five months after samples are collected and shipped.

Table 4-1

Schedule of Deliverables
U.S. Scrape Site

Task	Deliverable	Schedule
1.3	Sampling Plan	Submit draft copy four (4) weeks after NTP.
1.4	Quality Assurance Project Plan	Submit draft copy two (2) weeks after approval of Sampling Plan.
1.5	Work Plan	Submit draft copy one (1) week after approval of QAPP.
2.7	Task 2 Technical Memorandum	Submit draft copy three (3) weeks after completion of field activities.
3.3	Task 3 Technical Memorandum (Evaluation of Investigation Derived Data)	Submit draft copy four (4) weeks after receipt of analytical data.
4.2	Task 4 Technical Memorandum (Public Health and Toxicological Assessment)	Submit draft copy eight (8) weeks after approval of Task 4 outline.
5.	SIF Report	Submit draft copy two (2) weeks after approval of Task 4 Technical Memorandum.

SECTION 5

BUDGET

A detailed cost summary by task and subtask is presented in Table 5-1. The table presents the requisite FIT hours, subcontractor costs and CLP analytical services.

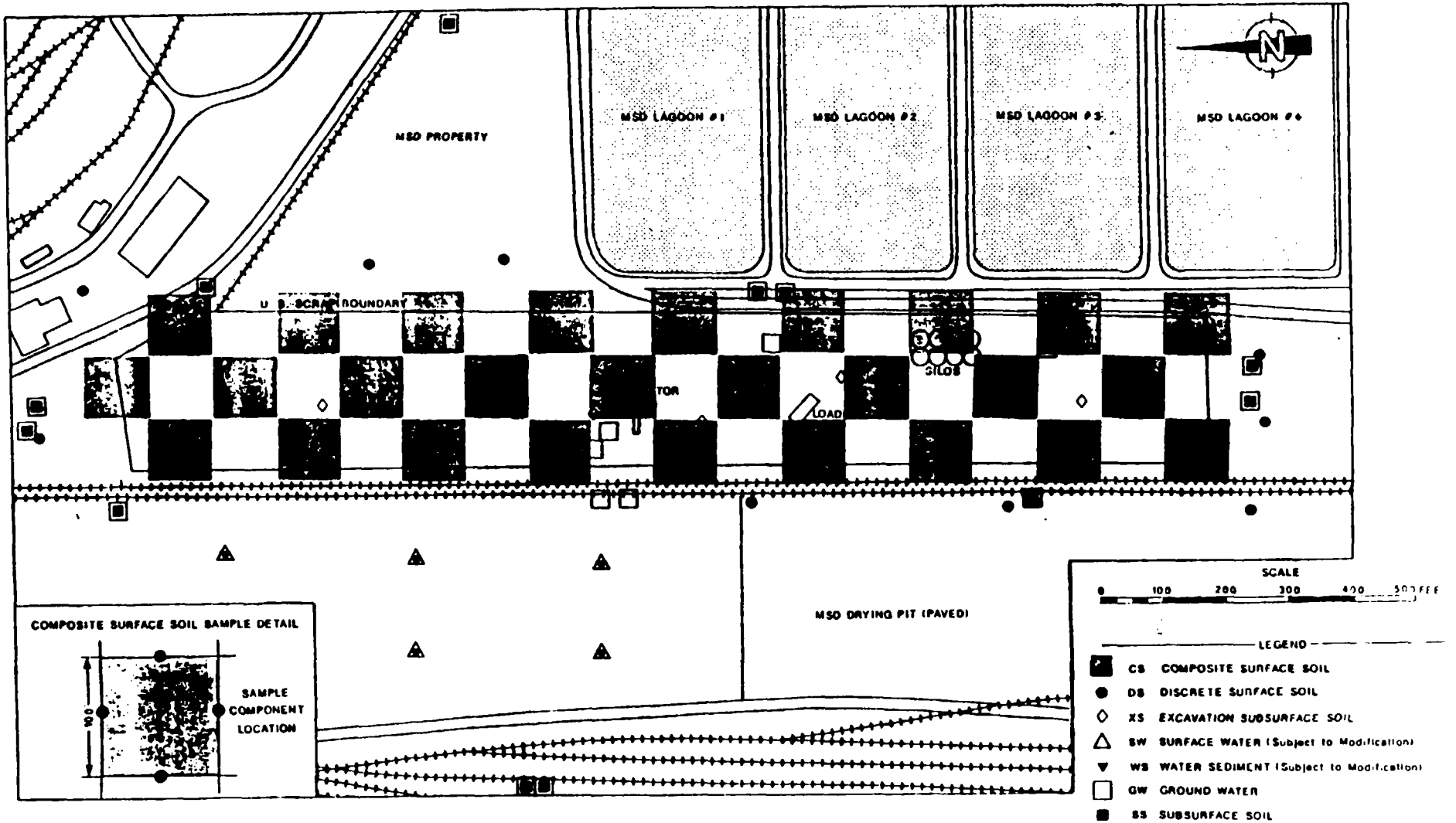

FIGURE 1-1 SAMPLING LOCATION MAP